Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) In a cantilever-based instrument having oscillation means to cycle [[the]] a base position of [[the]] a cantilever and measure [[its]] a cantilever velocity, optical detection means to sense deflection of the cantilever and computer software means for calculating power spectra from the optical detection means, a method for determining the derivative of [[the]] a change in cantilever deflection with respect to a change in [[the]] a z position of [[the]] a cantilever tip without making contact with a surface, ~~including the following steps:~~ comprising:

cycling [[the]] a base position of the cantilever while measuring [[its]] the cantelever velocity (v) [[,]];

optically measuring cantilever deflection ~~with the optical detection means,~~ (ΔV);

calculating a power spectrum;

calculating [[the]] a resonant frequency (ω_o) and a quality factor (Q) of the cantilever from [[its]] the power spectrum ~~with computer software means~~;

determining an inverse optical lever sensitivity (InvOLS$_{hyst}$) by, at least in part, combining ~~such measurements and calculations in the relationship~~ the deflection, the resonant frequency and quality factor according to a relationship of:

$$InvOLS_{hyst} = \frac{\kappa v}{\omega_o Q \Delta V} \quad .$$

2.   (New)   A method for use in determining physical properties of a cantilever, comprising:

        oscillating a cantilever through a fluid;

        measuring the velocity of the cantilever;

        measuring a deflection of the cantilever;

        determining a power spectrum; and

        determining an inverse optical lever sensitivity based at least in part on the power spectrum.

3.   (New)   The method as claimed in claim 2, further
                    comprising:

        determining a spring constant of the cantilever based at least in part on the inverse optical sensitivity.

4.   (New)   The method as claimed in claim 2, wherein the determining the inverse optical lever sensitivity includes determining a thermal spectrum and determining the inverse optical lever sensitivity based at least in part on the thermal spectrum.

5.   (New)   The method as claimed in claim 2, wherein the determining the inverse optical lever sensitivity includes determining a resonant frequency and a quality factor based at least in part on the power spectrum and determining the inverse optical lever sensitivity based at least in part on the resonant frequency and the quality factor.

6.   (New)   The method as claimed in claim 2, further comprising:

        determining a distance between a cantilever tip and a surface; and

determining a phenomenological factor based on the distance between the cantilever tip and the surface, wherein the determining the inverse optical lever sensitivity includes determining the inverse optical lever sensitivity based at least in part on the phenomenological factor.

7.   (New)   The method as claimed in claim 2, wherein the measuring the deflection of the cantilever includes optically measuring the deflection of the cantilever.

8.   (New)   A method for use in using cantilever-based instruments, comprising:

applying a drag force to a cantilever without a tip of the cantilever contacting a surface;

monitoring a deflection of the cantilever; and

determining characteristics based on the deflection.

9.   (New)   The method as claimed in claim 8, wherein the applying the drag force includes directing a fluid flow over the cantilever; and

the determining characteristics includes determining a fluid flow rate of the fluid flow.

10.   (New)   The method as claimed in claim 9, wherein the determining the fluid flow rate includes determining the fluid flow rate based at least in part on a spring constant and dampening constant of the cantilever.

11.   (New)   The method as claimed in claim 10, wherein prior to the directing the fluid flow, the applying the drag force includes oscillating the cantilever;

the monitoring the deflection includes monitoring the deflection of the cantilever while oscillating;

the determining characteristics includes determining a power spectrum of the cantilever based on the deflection of the cantilever while oscillating and determining the spring constant based at least in part on the power spectrum.

12. (New)   The method as claimed in claim 8, wherein the monitoring the deflection includes determining a hysteresis of deflection of the cantilever and monitoring the hysteresis; and

the determining characteristics includes determining a distance between the cantilever tip and the surface.

13. (New)   The method as claimed in claim 8, wherein the applying the drag force includes oscillating the cantilever;

the monitoring the deflection includes monitoring the deflection of the cantilever while oscillating; and

the determining characteristics includes determining a power spectrum of the cantilever based on the deflection of the cantilever while oscillating and determining a spring constant based at least in part on the power spectrum.

14. (New)   The method as claimed in claim 13, wherein the monitoring the deflection further includes determining a hysteresis of deflection of the cantilever and monitoring the hysteresis; and

the determining characteristics includes determining a distance between the cantilever tip and the surface.

15. (New)   An apparatus for determining cantilever parameters, comprising:

means for applying a drag force on a cantilever;

means for optically monitoring a deflection of the cantilever; and

means for determining characteristics based on the deflection.

16. (New)   The apparatus as claimed in claim 15, wherein the means for applying the drag force includes means for directing a fluid flow over the cantilever; and

the means for determining characteristics includes means for computing configured to calculate a fluid flow rate of the fluid flow.

17. (New)   The apparatus as claimed in claim 16, wherein the means for applying the drag force includes means for oscillating the cantilever prior to the means for applying the fluid flow directing the fluid flow over the cantilever;

the means for monitoring the deflection is further configured to monitor the deflection of the cantilever while the means for oscillating oscillates the cantilever;

the means for computing is further configured to calculate a power spectrum of the cantilever based on the deflection of the cantilever while oscillating and determine a spring constant based at least in part on the power spectrum; and

the means for computing is further configured to calculating the fluid flow rate based at least in part on the spring constant.

18. (New)   The apparatus as claimed in claim 15, wherein the means for applying the drag force includes a means for oscillating the cantilever;

the means for optically monitoring the deflection is configured to monitor the deflection of the cantilever while oscillating; and

the means for determining characteristics includes a means for computing configured to calculate a power spectrum of the cantilever based on the deflection of the cantilever while oscillating and to calculate a spring constant based at least in part on the power spectrum.

19. (New) The apparatus as claimed in claim 18, further comprising:

means for determining a hysteresis of deflection of the cantilever; and

the means for computing is further configured to compute a distance between the cantilever tip and the surface based at least in part on the hysteresis.